WHAT IS CLAIMED IS:

- 1. A solid phase for binding nucleic acids comprising:
 - a solid support portion comprising a matrix selected from silica, glass, insoluble synthetic polymers, and insoluble polysaccharides to which is attached on a surface;
 - a cleavable linker portion to the solid support portion, and
 - a nucleic acid binding portion for attracting and binding nucleic acids linked to the cleavable linker portion.
- 2. The solid phase of claim 1 wherein the nucleic acid binding portion is selected from a ternary sulfonium group of the formula SR_2^+ X⁻ where R is selected from $C_1^-C_{20}^-$ alkyl, aralkyl and aryl groups, a quaternary ammonium group of the formula NR_3^+ X⁻ wherein R is selected from $C_4^-C_{20}^-$ alkyl, aralkyl and aryl groups, and a quaternary phosphonium group PR_3^+ X⁻ wherein R is selected from $C_1^-C_{20}^-$ alkyl, aralkyl and aryl groups, and wherein X is an anion.
 - 3. The solid phase of claim 2 wherein the nucleic acid binding portion is a quaternary ammonium group and the R groups each contain from 4-20 carbon atoms.
 - 4. The solid phase of claim 2 wherein the nucleic acid binding portion is a quaternary phosphonium group and the R groups each contain from 1-20 carbon atoms.

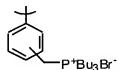
- 5. The solid phase of claim 4 wherein each R group is a butyl group.
- 6. The solid phase of claim 1 wherein the solid support portion comprises an insoluble synthetic polymer.
- 7. The solid phase of claim 1 wherein the solid support portion comprises a glass matrix.
- 8. The solid phase of claim 1 wherein the solid support portion comprises a silica matrix.
- 9. The solid phase of claim 1 wherein the cleavable linker portion further comprises one or more connecting portions.
- 10. The solid phase of claim 1 further comprising a magnetically responsive portion.
- 11. The solid phase of claim 1 wherein the cleavable linker portion is cleaved hydrolytically.
- 12. The solid phase of claim 11 wherein the hydrolytically cleavable linker portion is an ester or thioester group.
- 13. The solid phase of claim 1 wherein the cleavable linker portion is cleaved reductively.
- 14. The solid phase of claim 1 wherein the cleavable linker portion comprises a triggerable dioxetane ring.

- 15. The solid phase of claim 1 wherein the cleavable linker portion comprises an electron rich alkene which is cleaved by conversion to a thermally unstable dioxetane.
- 16. The solid phase of claim 1 wherein the cleavable linker portion is cleaved enzymatically.
- 17. The solid phase of claim 16 wherein the cleavable linker portion comprises an acridan ketene dithioacetal which is cleaved by reaction with a peroxidase and a peroxide.
- 18. The solid phase of claim 16 wherein the cleavable linker portion comprises an ester which is cleaved by a hydrolase enzyme or an esterase enzyme.
- 19. The solid phase of claim 16 wherein the cleavable linker portion comprises an amide which is cleaved by a protease enzyme.
- 20. The solid phase of claim 16 wherein the cleavable linker portion comprises a peptide which is cleaved by a peptidase enzyme.
- 21. The solid phase of claim 16 wherein the cleavable linker portion comprises a glycoside which is cleaved by a glycosidase enzyme.

22. The solid phase of claim 12 wherein the cleavable linker portion comprises a thioester having the formula:

- 5 wherein Q is P or N and R is alkyl of 1-20 carbons.
 - 23. The solid phase of claim 22 wherein the cleavable linker portion comprises a thioester having the formula:

- 24. The solid phase of claim 1 wherein the cleavable linker portion is an alkylene group of at least one carbon atom bonded to a trialkylphosphonium or triarylphosphonium nucleic acid binding portion and is cleavable by means of a Wittig reaction with a ketone or aldehyde.
- 25. The solid phase of claim 24 wherein the cleavable linker portion has the formula



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26. The solid phase of claim 2 wherein the nucleic acid binding portion of the solid phase is a ternary sulfonium group of the formula SR_2^+ X⁻ where R is selected from $C_1^-C_{20}$ alkyl, aralkyl and aryl groups, and wherein X is an anion.